



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.A. DEGREE EXAMINATION – ECONOMICS**

**FIFTH SEMESTER – APRIL 2016**

**EC 5404 - MATHEMATICS FOR ECONOMISTS**

Date: 25-04-2016  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**PART A**

**Answer any FIVE of the following questions:-**

**[ 5x4=20 marks]**

1. Define 'Limits'.
2. Distinguish between 'Left Side Limit' and 'Right Side Limit'.
3. State the conditions for continuity of a function.
4. State the conditions for relative maxima and minima of  $Z = f(X,Y)$ .
5. The total cost function of a firm is given by  $TC = 625 - 5q + q^2$ . Show that optimum size of output of the firm is 25 units.
6. Find the total differential if  $Z = 2x^3 - 4xy^2 + 3y^3$ .
7. Evaluate  $\frac{4x^3+2}{(4x^2+8x)^5} dx$ .

**PART B**

**Answer any FOUR of the following questions:-**

**[4X10=40 marks]**

8. Explain the properties of limits.
9. Discuss the types of discontinuities with examples.
10. Explain the conditions for relative maxima, minima and point of inflection in  $y = f(x)$ .
11. Derive  $MR = AR (1 + \frac{1}{ed})$ .
12. Show that Average cost and Marginal cost intersect at the lowest point of the Average cost function.
13. State and prove Euler's Theorem.
14. Given the Consumption function  $C = C(Y) = 1000 - \frac{5000}{3+Y}$ .
  - (i) Find the marginal propensity to consume when  $Y = 97$ .
  - (ii) Find the marginal propensity to save when  $Y = 97$ .
  - (iii) Determine whether MPC and MPS move in the same direction when  $Y$  changes.

## PART C

Answer any TWO of the following question:-

[ 2X20=40 marks]

15. Derive the properties of Cobb Douglas production function.
16. A monopolist produces his product in two different plants and his total cost functions of the two plants are given by

$$TC_1 = 10 - 2Q_1 + Q_1^2$$

$$TC_2 = 15 - 6Q_2 + 2Q_2^2$$

If the average revenue function is given by  $AR = 50 - 2Q$ , where  $Q = Q_1 + Q_2$ , find:

- His profit maximizing output to be produced in plants 1 and 2
  - His maximum profit.
17. Given the utility function  $u = 2 + x + 2y + xy$  and the budget constraint is  $4x + 6y = 94$ , find out the equilibrium purchase of  $x$  and  $y$  in order to maximize total utility.
18. The quantity demanded and the corresponding price under pure competition are determined by the demand and supply functions  $P = 36 - q^2$  and  $P = 6 + \frac{q^2}{4}$  respectively. Determine the corresponding Consumers' surplus and Producers' surplus.

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